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ABSTRACT

Profile analysis refers to interpreting or analyzing the pattern of tests, subtests, or scores. The analysis may be across groups or across scores for one individual. This approach to analyzing data is being used by clinicians to help in the translation of the results of popular assessment instruments. This paper examines several examples of the use of profile analysis, including discussions of the use of profile analysis with the Wechsler Scales, the Minnesota Multiphasic Personality Inventory-2, and the technique of multidimensional analysis. Cautions in the use of profile analysis are also discussed. One such caution involves the standard error of measurement. Caution is also required when a hypothesis has been made regarding an individual's performance. (Contains 10 references.) (SLD)

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The Practical Use of Profile Analysis

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Abstract

Profile analysis refers to interpreting or analyzing the pattern of tests, or subtests, scores. This analysis could be across groups or across scores for one individual. This approach to analyzing data is being employed by clinicians to help in the translation of the results of popular assessment instruments. The following paper will examine several examples of how profile analysis is employed. This will include a discussion on the Wechsler Scales, the MMPI-2, and Multidimensional Analysis. Cautions of profile analysis will also be discussed.

Lyman (1998) began his discussion on profile analysis with the introduction of a test profile. He stated that "a test profile is a graph that shows the test scores for an individual (or, less often, the average score of a class or some other group)" (p. 121). Davison (1996) expanded this idea by examining who is interpreting the data. Depending on whether a statistician or a clinician interprets the data determines which type of test profile is employed. Shelton (1998) agreed with Davison by adding that "statisticians usually adopt a column perspective (or an emphasis on a single variable) [and] clinicians most often adopt a row perspective" due to the emphasis on subject differences (p. 6). Yet, whether a column or row perspective is employed, a test profile can still be used to interpret the data.

Taking this discussion of test profiles and interpretations a step further, Sattler (1992) wrote that profile analysis, in the context of IQ tests, "refers to interpreting or analyzing the pattern of scaled scores and Deviation IQs (both in the form of a test profile) obtained by an individual examinee. Some profiles show extreme variability, others moderate variability, and still others minimal variability" (p.166). Anastasi and Urbina (1997) further noted that "profile analysis provides data that may be of help in the diagnosis of brain damage and various forms of psychopathology" through the interpretation of the profile of "test scores for significant strengths and weaknesses" (p. 512).

Using Profile Analysis with the Wechsler Scales

Sattler (1992) suggested that profile analysis was first used with Wechsler scales in the hope that it would increase diagnostic precision. He explained "unfortunately, using profile analysis with the WISC-R, WPPSI, and WAIS-R is problematic because the

subtests are not as reliable as the Deviation IQs and do not measure unique processes. Still, profiles point out strengths and weaknesses, and these patterns allow for the development of hypotheses that can contribute to an understanding of the child" (p. 166).

Sattler (1992) explained the use of profile analysis with the WISC-R with seven methods. Method 1 compares the Verbal and Performance scale Iqs; Methods 2, 3, and 4 compare subtests scale scores with various mean scales scores; Method 5 compares sets of individual subtest scores; Method 6 compares Verbal Comprehension, Perceptual Organization and Freedom from Distractibility factor scores; and Method 7 compares subtest scales scores in each factor with their respective factor scores. Anastasi and Urbina (1997) added to these comparisons by utilizing three major procedures with the WISC-R. The first of these procedures combines Sattler's seven methods by examining the amount of scatter or variance between the individual's scaled scores. The second procedure compares an individual's score within the normative group and the third is based on the "'score pattern' associated with particular clinical syndromes" (p. 512). For these comparisons and procedures, "profile analysis is dependent on the presence of statistically significant differences between the scales, factor scores, and subtests" (Sattler, 1992, p. 167).

Through the research of Sattler and Kuncik (1976), a clinician's interpretation of profiles with high variability, as indicative of a higher IQ when in actuality no difference was present adds to the importance of statistical significance between scale scores before an interpretation is provided. In addition to statistical significance, a clinician must also be aware of the scatter or variability in the profiles of normal individuals. Kaufman (1976) explained that the scatter between scale scores ranges between four and seven

points for the normal child on the WISC-R. He suggested that "before concluding that an exceptional child, or a group of exceptional children, exhibits marked scatter on [any particular test], the clinician must first consider the basel level of 'normal scatter'" (p. 285). The scatter in the WAIS-R is approached and interpreted slightly different than the WISC-R. Sattler (1992) suggested that to make multiple subtest comparisons the difference between the highest and lowest age-corrected subtest scores must first be determined. If the difference is greater than or equal to six, statistical significance has been established and the multiple comparisons can be interpreted. If the difference 'is less than six, multiple comparisons between individual subtests should not be made" (p. 240).

Using Profile Analysis with the MMPI-2

There are several steps in interpreting an MMPI-2 profile. The first step is concerned with the examinee acting in a consistent and accurate manner while completing the inventory. Greene (1991) suggested the "next step is to examine the data gathered from the individual validity and clinical scales for consistent and inconsistent information" (p. 289). The last step is to interpret the subgroups of scales, also known as interscale relationships. These relationships are considered the codetypes within the interpretation that determines an individual's normality, or abnormality, whichever the case may be.

Greene (1991) described three issues that are faced when interpreting a codetype within a profile. Issue 1 is concerned with the order of the codetype, whether this order makes a defference in the interpretation and whether the reference source being employed discriminates order. Issue 2 "involves the criterion group on which the [reference source

and the] interpretive system is based" (p. 290). Examples of the criterion groups that the reference sources include are "male veterans, adolescents, psychiatric inpatients, a wide variety of diagnostic and pathological groups, and college students" (p. 290). Issue 3 involved the elevation of the codetypes. Depending on the individual's demographics, for example age, and whether the MMPI or the MMPI-2 is being interpreted determine the elevation of the codetypes for diagnosis. Greene (1991) suggested that there needs to be more research on this issue to understand the true differences in elevation of codetypes.

Lyman (1998) wrote that "hundreds of studies involving profile analysis of the Minnesota Mulitphasic Personality Inventory II have been published, and some of them very rewarding....Profile analysis, in other words, is commendable and desirable if the data are adequate, but dangerous when attempted by the neophyte" (p. 127). Greene (1991) emphasized this point by stating that "it is extremely important, at any level of interpretation, for the clinician to be wary of focusing exclusively on any one feature and consequently ignoring, biasing, or misinterpreting the rest of the data" (p. 291).

Profile Analysis via Multidimensional Analysis

Thompson (1971) explained that multidimensional analysis "enables the researcher to determine whether groups of subjects can be distinguished from each other on the basis of entire personality profiles rather than by analyzing each trait individually" (p. 48). Multidimensional scaling or analysis employs "a data matrix in which rows represent people and columns represent measures" (Davison, 1995, p. 6). Consistent with the discussion on the difference between the test profiles of statisticians and clinicians on page 2, as with the clinicians, multidimensional scaling utilizes the

information in the data matrix by rows. Davison (1995) converted this information into latent variables; therefore, the "row profile can be represented as a linear combination of the latent row profiles" (p. 7). At this point, the information can be treated like a test profile and profile analysis can be implemented.

Summary

There are some words of caution when employing profile analysis. One such caution involves the standard error of measurement. Each test, or subtest, has a standard error of measurement and this error can be exaggerated making comparisons with other tests, or subtests, which also have a standard error of measurement. Therefore, Lyman (1998) suggested that "we need specifically to consider the standard error of measurement. The difference between the test scores may not be so great as it looks in a profile" (p. 126).

Another caution is when a hypothesis has been made regarding an individual's performance. Sattler (1992) advised that all sources of information be considered, "including the child's test scores; the child's attitude, background, and temperament; testing of limits; observations; interviews with teachers, parents, and the child; and other background information. Consistent findings from several sources provide you with a firmer ground for making interpretations" (p. 730). Additional examples of qualitative data that can be gathered on the examinee is provided by Anastasi and Urbina (1997), which "include motor activities, speech, emotional responses, and attitude toward the examiner, as well as approach to the test materials and the testing environment" (p. 513).

As best stated by Shelton (1998), "although profile analysis is not commonly accepted by most statisticians, it can be a useful way of analyzing data" (p. 10). Over

time profile analysis has gained popularity and, along with the Wechsler scales, the MMPI-2, and Multidimensional Scaling, it is being used with the California Psychological Inventory, the Self Directed Search, the 16PF, the Peabody Individual Achievement Test and the Test of Language Development (Lyman, 1998; Shelton, 1998). Profile analysis is proving to be a useful tool with clinicians in interpreting group data and intra-individual information. The next step is to research how profile analysis can become more statistically sound with valid and reliable interpretations in the comparing of individual and group scores.

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